KEYING.

The easiest way to key the Exciter when you wish to transmit is to run the B+ for the Exciter through the microphone push-to-talk switch. Although a relay can be used, it normally is not necessary, since the 350-450 mA required by the Exciter may be switched easily by the microphone switch. If the LPA 2-15 Power Amplifier is used with the Exciter, T/R switching for the antenna is accomplished electronically at the PA. If an LPA 2-45 or other higher power amplifier is used, an external coax relay with auxiliary contacts should be used to switch antenna and B+ signals.

If the T50 Exciter is to be used on CW instead of FM, the B+ to the Exciter can be broken at Z3/R34. B+ should be applied to the low level stages through Z3 continuously, and cw keyed B+ should be applied to the driver and PA stages through E1 to key the carrier on and off.

The usual troubleshooting techniques of checking dc voltages and signal tracing with an rf voltmeter probe will work well in troubleshooting the Exciter. A dc voltage chart, an rf voltage chart, and a list of typical audio levels are given to act as a guide to troubleshooting. Although voltages may vary widely from set to set and under various operating and measurment conditions, the indications may be helpful when used in a logical troubleshooting procedure. The Exciter should draw about 20-40 mA at idle (with crystal pulled) and about 350-450 mA at full 2W output.

Be careful when operating or troubleshooting to avoid driving the unit to levels over 2 Watts for extended periods or operating the unit at dc current drain levels over 500 mA. Also be careful to avoid continuous operation if an oscillation drives the unit to full output with the crystal pulled out. Keep an eye on an ammeter in the B+ line while tuning. Don't ever allow the unit to draw over 0 mA. Although it may be possible to obtain more than 2 Watts output, doing so may overheat the driver or PA transistors. Allowing these transistors to overheat may cause a thermal runaway condition, something which will not occur in normal operation. An unchecked thermal runaway can destroy a transistor. The symptom is a sudden drop in output power.

The most common troubles in all kits, based on our experience, are interchanged components (so you don't notice while building), cold solder joints, and solder splashes. Another common trouble is blown transistors due to reverse polarity or power line transients. It is a good practice to use a fuse and a reverse diode at the input of any homebrew gear. This practice can save much work and expense after an inadvertent mistake later on. Any relay coils on the B+ line should also have a reverse diode connected right across the coil to absorb the reverse transients which relays produce. Remember if you encounter problems during initial testing that it is easy to install parts in the wrong place. Don't take anything for granted. Double check everything in the event of trouble.

If all else fails, factory service is available at modest cost. Consult us first to obtain cost information before shipping unit back to the factory. Because we cannot do much that you can't, and because much of what we can do is checking everything described above, troubleshooting is time consuming no matter who does it. You can save the expense of factory service by your own diligent effort and that of friends. We are always available by phone to give technical advice - but please don't expect miracles.

TYPICAL DC VOLTAGES.

The following dc levels were measured with an 11 megohm fet vm on a sample Exciter with 13.6 Vdc B+ applied. All voltages may vary considerably without necessarily indicating trouble. The chart should be used with a logical troubleshooting plan. All voltages are positive with respect to ground except as indicated. Voltages are measured with crystal plugged in and oscillating and Exciter fully tuned to provide 2W output.

STAGE	E	B	C
Q1	0.85	1.5	4.5
Q2	0.04	0.6	1.5
CR1, CR2	A 1.8	C 1.4	-
Q3	4.2	4.8	9.1
Q4	4.3 (2.9)	2.8 (3.6)	8.3
Q5	3.1 (2.6)	3.4	6.2
Q6	1.4 (1.0)	1.7 (1.8)	13.6
Q7	2.2 (0)	0	13.6
Q8	1.3 (0)	0	13.6
Q9	0	-0.7 (0)	13.6
Q10	0	0	13.6
Q11	0	0	13.6

( ) = crystal pulled, no rf.

TYPICAL RF VOLTAGES.

The following measurments are rough checks of typical rf voltages (rms) at various points. These levels may be helpful to you. Although most hams do not have accurate rf voltmeters, a simple device, such as our model TE-3 RF Probe, may be used with a vtvm for signal tracing to find the point at which the signal may be blocked. These measurements were made with a Boonton model 92C RF Voltmeter without retuning. Regardless of what instrument is used, high impedances at some points result in sufficient loading so that the rf level is reduced when the probe is connected, or at least, probe loading results in inaccurate voltage measurements. Nevertheless, indications may be helpful in troubleshooting. (Voltages over 3 Vrms are beyond the range of the 92C.)

STAGE	E	B	C
Q4	2	4	0
Q5	0	1	1
Q6	0	1	over 3
Q7	0	3	over 3
Q8	0	2	2.5
Q9	0	2	3
Q10	0	1.5	over 3
Q11	0	3	over 3

TYPICAL AUDIO VOLTAGES.

Following are rough measurements of audio voltages (rms) which may be measured with a sensitive vtvm or an oscilloscope when a low impedance dynamic microphone is connected. Measurments given were taken with Tektronix T922 Scope with mic gain and deviation controls fully cw and sufficient audio input applied for full deviation of the rf signal. Measurements are typical of what might be indicated during a sustained whistle or with an audio signal generator. Of course, readings may vary widely with setups but none-the-less, indications may be useful for troubleshooting.

STAGE	E	B	C
Q1	0.5	1	10
Q2	0	10	700
Q3	500	500	-
Q4	-	30	-
Mic Input	1		
Repeater Input	700		